

REMARKS

Claims 1-7 are pending in the present application. Claims 1-5 have been amended. Claims 6 and 7 are newly added. Support for the claim amendments may be found in the specification, at least, at page 9, lines 10-26; page 10, lines 10-23; and page 11, line 7. No new matter has been added by way of the present claim amendments.

Rejection Under 35 U.S.C. § 102

Claims 1 and 3-5 stand rejected as being anticipated by USP 6,063,871 to Kishine et al. (hereinafter “the ‘871 patent”).

Applicants respectfully submit that the ‘871 patent does not disclose a value of an activation energy of polymers and the relationship of the newly introduced requirement (vii).

Applicants calculated a value of MFR₂₀ for polymers disclosed in the working examples of the ‘871 patent to investigate whether the relationship is satisfied for polymer of the ‘871 patent.

Applicants submit herewith for the Examiner’s careful consideration, *Rheologica Acta.*, **22, 90(1983)** by A. V. Shenoy et al. (hereinafter “Shenoy”). According to the description in Shenoy, the following relationship is satisfied for polymers having an apparent viscosity of η_a and a share stress of γ :

$$\eta_a \propto \gamma^{(n-1)}$$

The value of (n-1) is calculated from a slope of the line obtained by plotting Log η_a and Log γ of polymers in the non-Newtonian region.

Therefore a value of MFR_{20} of the polymers in the '871 patent can be estimated by a value of MFR_2 disclosed in the '871 patent.

The line in the figure below is obtained by applying the least-square method to samples evaluated under a loading of 2.16 kg at 190°C.

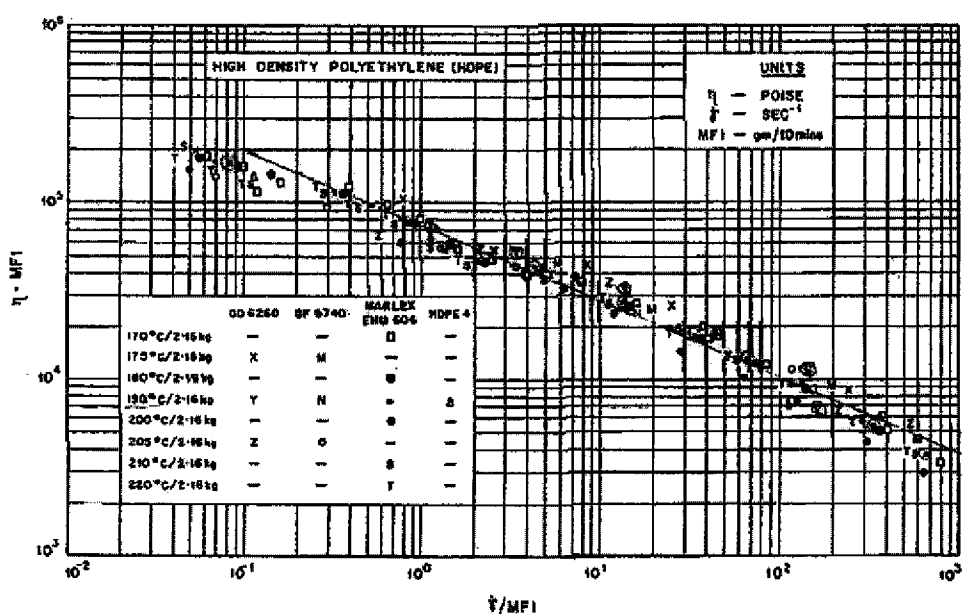


Fig. 6. Master curve for HDPE

The value of $(n-1)$, $(n-1) = -0.4331$, is obtained as a slope the line; therefore the value of “n” is 0.5669.

Other values for different loading are estimated by the following equation (Eq-21) described in page 95 of Shenoy:

$$MFR_2/MFR_1 = (L_2/L_1)^{1/n} \text{ ----(Eq-21)}$$

wherein L_1 and L_2 represent piston load 1 and piston load 2, respectively.

The results are shown in the tables below.

From Table 1, it is clear that polymers of the '871 patent do not satisfy the requirements (i) and (vii) of claim 1 simultaneously, with the exception of Example 4.

Table 1

Example and Comparative example of '871 patent					
No.	MFR _{2.16} (g/10min) (disclosed)	MFR _{21.6} * (g/10min) (estimated)	Values of lower and upper limit of the (Eq-5)		[η] (dl/g) (disclosed***)
			A**	B**	
Example 1	2.2 ****	132.0	0.74	1.59	2.1
Example 2	0.61	36.6	1.47	2.32	2.2
Example 3	0.02	1.2	3.40	4.25	3.6
Example 4	0.12	7.2	2.39	3.24	2.4
Comparative Example 1	0.5	31.2	1.56	2.41	2.3

* The definition of MFR_{21.6} is same as the definition of MFR₂₀ of the subject application.

** A and B are lower and upper limits of the following (Eq-5) for the requirement (vii) of the amended claim 1 of the subject application, respectively.

$$-1.3 \log (MFR_{20}) + 3.5 \leq [\eta] \leq -1.3 \log (MFR_{20}) + 4.35 \text{ ---(Eq-5)}$$

*** [η] that is not directly disclosed in the '871 patent, the value is calculated from [η] of ethylene type polymers (A) and (B).

**** Bold italic means that the value satisfies the requirement of claim 1.

However, from Table 2, it is clear that Example 4 does not satisfy the requirement (ii) of the amended claim 1.

Table 2

Example and Comparative example of the '871 patent				
No.	MFR _{2.16} (g/10min) (disclosed)	Values of lower and upper limit of the (Eq-3) (calculated)		MT (g) (disclosed)
		C*	D*	
Example 1	2.2	2.3	5.2	4
Example 2	0.61	4.7	10.5	9
Example 3	0.02	31.0	68.8	30
Example 4	0.12	11.6	25.7	12
Comparative Example 1	0.5	5.2	11.5	8

* C and D are lower and upper limits of the following (Eq-3) for the requirement (ii) of the amended claim 1 of the subject application, respectively.

$$8.0 \times \text{MFR}_2^{-0.53} \geq \text{MT} \geq 3.6 \times \text{MFR}_2^{-0.53} \quad \text{---(Eq-3)}$$

** Bold italic means that the value satisfies the requirement of claim 1 in view of requirement (i) or (ii).

Therefore, it is reasonable to conclude that the ethylene-based polymer, as is presently recited in claim 1, is not disclosed by the '871 patent.

While not included as part of the statement of the rejection, the Examiner has cited USP 7,205,358 (hereinafter "the '358 patent") within the rationale of the outstanding rejection. However, Applicants respectfully submit that the '358 patent is irrelevant to the presently claimed invention. The '358 patent only discloses that an activation energy (Ea) of general-

purpose ethylene/ α -olefin copolymer is 35 KJ/mol or lower. The '358 patent does not disclose an ethylene-based polymer satisfying the requirements (i), (ii), (iii), (iv) and (vii) simultaneously.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the outstanding rejection of claim 1 and the claims which depend thereon.

Allowable Subject Matter

Applicants kindly thank the Examiner for indicating that claim 2 contains allowable subject matter.

In view of the foregoing, Applicants believe the pending application is in condition for allowance. A Notice of Allowance is earnestly solicited.

Conclusion

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Monique T. Cole, Reg. No. 60,154 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

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Attachment: *Rheologica Acta.*, 22, 90(1983), by A. V. Shenoy et al.